REMARKS

Claims 1-11 are currently pending in the application. By this amendment, claims 1 and 7 have been amended. The foregoing separate sheets marked as "Listing of Claims" show all the claims in the application, with an indication of the current status of each.

Applicant once again thanks Examiners for the courtesy and helpfulness extended during the interview of April 1, 2009. As a result of that interview, Applicant has revised the proposed claim amendments to include language of the preamble within the body of the amended claims.

Claim Rejections: 35 USC § 103(a)

Claims 1-11 stand rejected under 35 USC § 103(a) as unpatentable over McQueen et al., (US 6,069,696, hereinafter "McQueen") in view of Gu (US 6,606,579) and in further view of Wargon (US 2004/0153283). This rejection is traversed. Applicant is aware that this rejection is based on a combination of references. However, McQueen is clearly the primary reference and will be discussed in depth initially.

The present invention provides an apparatus and method for determining the price of a product that is priced by weight (e.g. a price to weight ratio such as $1.00 per pound) without using a scale. The method comprises generating a digitized visual image of the product with a camera and, using the visual image, identifying the product by type and determining the volume of the product. Applicant notes that "the product" may be a collection of objects, e.g. several oranges. Once the product type and volume are known, the weight of the product is calculated by looking up a representative density of such products in a database (volume x density = weight). The price of the product is then calculated based on the price to weight ratio. Advantages of the invention include that a scale is not used and bar code scanning is not used at any stage of the method. As can be seen, obtaining a visual image of the product is central to the invention, as the visual image is used to determine both 1) product type and 2) product volume. Current amendments of independent claims 1 and 7 which reflect this feature by reciting "visual" are supported in the specification, for example, in paragraph [0006] of the published application.

The apparatus for carrying out the method requires: one or more cameras for generating a digitized visual image of the product; means for <u>identifying the product by type based on the digitized visual image</u>; means for determining a volume of the product based on the digitized

visual image; means for determining a density of the product from a database of lookup tables which include density information for a plurality of products; and a computer terminal which computes the weight of the product as a function of volume and density and a price of the product as a function of a price/weight ratio. Claim 7 has hereby been amended to recite more clearly that the weight and price of the product are calculated, in fact, from the volume and product type, which are both determined based on the digitized visual image generated by the camera.

In contrast, McQueen does not describe determining the identity of a product by "taking a picture"of the object with a camera, and using the visual digitized image to establish the identity of the object. In fact, statements made in McQueen teach against the use of cameras in product identification. Column 1, lines 48-55 state: "For example, one such proposed systems utilizes a color video camera to detect visual cues and analyzes certain visual characteristics such as color, texture, shape and size in an attempt to determine enough "uniqueness" of the product to identify it. Such systems have yet to prove feasible in handling the variable characteristics in like items, and the changing characteristics of produce items as they age or ripen." The invention of McQueen is intended to improve upon such systems, an is an object recognition system to identify objects by type based on 1) patterns of wavelengths and intensities (i.e. the *spectral profiles*) of light reflected from the objects, or 2) alternatively, patterns of reflected thermal energy. With respect to the first embodiment, see Figures 2, 3, 4 and 6 and their respective figure legends, which state that spectral profiles are obtained. This is accomplished by capturing light that is reflected from the objects, and separating the color components (wavelengths) of the reflected light (see the abstract; column 2, lines 1-10; column 3, lines 49-51 and lines 57-60). The apparatus of McQueen thus requires a light collection system and a "light separator" (see Figure 1), for example, a diffraction grating (see legend for Figure 7), which separates the light into its component wavelengths (see Figure 7). Applicant notes that only a small "slit" of reflected light is collected (see the "inspection slit" of Figure 2 and "image portions" 120 and 130 from Figure 6A sand 6B, respectively). The separated light components from the small imaged portions of the product are directed to an optical detector which outputs a signal having an amplitude corresponding to the intensity of the color components (column 5, lines 30-33). The

result is a "waterfall plot" or some other electronic representation of the pattern of the intensity of the various wavelengths of reflected light collected from the objects (see Figure 5 and Figure 6A and 6B). Such patterns are distinctive for different colors or color combinations and hence for products of different colors. By comparing the diffraction pattern obtained for an unknown object with a database of diffraction patterns of known objects using a pattern recognition system, the unknown object can be identified. The technique can be used to distinguish items that are closely related. For example, see Figure 16a where the unique patterns of light wavelengths reflected by different types of lettuces are shown, and Figure 16b where the patterns for different types of potatoes are shown.

The second embodiment of McQueen is discussed in column 16, at lines 19-36. This embodiment involves identification of an object by detecting the patterns of infrared radiation (heat) emitted by the object (column 16, lines 28-29). This embodiment requires an infrared impulse source, which directs a pulse of infrared energy toward the object to be identified (column 16, lines 25-26) and a thermal sensor such as a thermal imaging camera (column 16, line 27, depicted in Figure 11) to capture the emitted infrared energy. Comparison to a database of captured thermal energy patterns from various objects is used to identify the object. Again, this embodiment does not involve determining the identity of a product by "taking a picture"of the object with a camera, and using the visual digitized image to establish the identity of the object.

Thus, thus, the invention of McQueen does not in any embodiment, use a digitized visual image obtained with a camera to identify a product

The only references to a camera in McQueen are in embodiments which require two items: 1) an optical code scanner; and 2) an optical data capture system, such as the McQueen apparatus (column 12, lines 32-34; column 13, lines 20-23). However, even in such alternative cases, the presence of a conventional optical scanner is required, and no further description of the purported video camera-based systems is provided. Again, this embodiment contrasts with, and indeed teaches away from, the present invention in that the apparatus of the present invention does not and would not include an optical scanner. Rather, the apparatus of the present invention is designed to replace optical scanners and scales (see the Background section of the application).

With respect to Examiner's points A-F, Applicant replies as follows:

A) means/steps for generating a digitized image of the a product with a camera:

Examiner refers to column 9, lines 65-67, column 10, lines 1-11, column 16, lines 19-36 and Figure 11 as purportedly disclosing "a means/step for generating a digitized image of the product with a camera" (top of page 3 of the Office Action). This is incorrect. The "image" discussed in column 9, lines 65-67, and column 10, lines 1-11 is not captured by a camera. The last line of column 9 explicitly states that the image is captured by "any of the FIG. 2, 3 or 4 embodiments". The Figure 2 embodiment captures images using a light source, and reflected light passes through an inspection slit through a protective window and lines onto a diffraction grating, through a second (optional) lens, and option mirror, and a required two-dimensional detector array, which detects the widths of the wavelengths that were reflected (see figure legend in column 3 at lines 1-3). This apparatus is not and does not involve the use of a camera. The Figure 3 embodiment captures images using a light source, light reflected from the product onto a hologram, and an optical detector (see figure legend in column 3 at lines 4-6). This apparatus is not and does not involve the use of a camera. Figure 4 depicts "a portion of a system for measuring the spectral profile of an object or a set of objects using narrowband emitters at several wavelengths (see figure legend in column 3 at lines 7-9). Contrary to Examiner's assertion, none of these are "a means/step for generating a digitized image of the product with a camera" as required in claims 1 and 7. In particular, a digitized visual image is not generated with a camera.

With respect to Examiner's reference to column 16, lines 19-36 and Figure 11, the "camera" referred to in these passages is a "thermal imaging camera" (column 16, line 27). Figure 11 is a depiction of a thermal camera (see figure legend, column 3, lines 28-29). Those of skill in the art would recognize that such a camera does not visually detect objects, but rather detects infrared radiation. Applicant also notes that this embodiment requires the presence of an infrared impulse *source* as well, since the thermal imaging camera is used to detect infrared radiation that, upon transmission from the infrared source to the object, is reflected from the object (please read column 16, lines 27-36). Without the infrared source, the embodiment would be inoperable. Therefore, contrary to Examiner's assertion, this embodiment is not "a means/step

for generating a digitized <u>visual</u> image of the product <u>with a camera</u>" as required in claims 1 and 7.

B) means or step for identifying the product by type using the digitized image

Examiner again refers to column 9, lines 65-67, column 10, lines 1-11, column 16, lines 19-36 and Figure 11. As discussed above, none of those passages from McQueen describe the use of a camera to generate a digitized visual image, and thus no means for identifying a product using a digitized visual image is present. No digitized visual image is generated. Rather, the product is identified by analyzing either the pattern of wavelengths of light reflected from the product (spectral profile) or the pattern of reflected thermal energy. A visual digitized image is neither produced nor used to identify the product.

In summary, McQueen is totally missing two required features/steps of the present invention as recited in claim 1 and 7.

C) means of step for determining a volume of the product from the digitized image of the product

Examiner refers to column 14, lines 65-67, and column 15, lines 1-2 for determining an object volume from multiple images from e.g. a camera. Applicant notes that the camera is not, however, used to <u>identify the object <i>type</i></u> as is the case in the present invention. According to McQueen, actual object recognition (identification of object type) is not carried out based on a digitized image generated by a camera but is carried out as described above, i.e. by detecting spectral or thermal profiles of reflected light or heat. One of those techniques must be present in the invention of McQueen or the principle of operation of the invention would be rendered unsatisfactory for its intended purpose, and the principle of operation of the McQueen invention would be changed.

D) means/step for determining a density for the product type identified in the identifying step

Applicant respectfully notes that this point is moot because the "identifying step" of McQueen has been fully distinguished from that of the present invention in the discussion above. Briefly, in McQueen product identification is based on a spectral or thermal profile of reflected light or heat whereas in the present invention, product identification is based on a visual digitized image obtained with a camera.

YOR920030566US1

E) computer terminal for computing or determining a weight of the product

Examiner refers to column 4, lines 3-17 and column 14, lines 60-67 and column 15, lines 1-5. Firstly, Applicant notes that column 4, lines 3-17 refers to weighing an object using a conventional weighting pan ("housing 51 has a weighing pan (or weighing plate)"). Applicant submits that it is not surprising that the apparatus of McQueen includes a weighing pan. The inventive identification system of McQueen is directed to a unique means to identify a product based on spectral or thermal patterns (e.g. "this product is an orange"), and is not intended to do anything else, such as weigh the object. Thus, some means of calculating the weight must be employed in order to establish the quantity of the product that is present and hence its price.

In contrast, according to the present invention, both identity and volume (and hence weight, and price) of an object are determined based solely on a digitized visual image obtained with a camera.

F) calculating a price fo the product as a function of a calculated weight and a price/weight ratio

For item F, Examiner refers to Figure 2 as disclosure of calculating a price of an object as price/weight. Applicant notes that Figure 2 depicts a conventional scale. Applicant further notes that such a scale would not be present in the apparatus of the present invention, which operates without a scale. In fact, one advantage of the present invention is that a scale is NOT used to compute the weight of the object. Claims 1 and 7 have hereby been amended to recite this feature (no scale is in the apparatus), support for which is found in the specification as filed, for example, on page 2 at line 6.

In summary, Examiner has failed to identify elements corresponding to those of the apparatus and method of the present invention in the apparatus or methods of McQueen. McQueen identifies objects by type using spectral or thermal profiles, and uses a method such as a conventional scale to weigh the identified objects. In contrast, the present invention identifies and determines the volume and hence weight of an object using a digitized visual image(s) of the object that is obtained with a camera.

Examiner has relied on Gu only to teach accessing a database of densities. Applicant has above demonstrated that McQueen does not possess essential features of the present application, and submits that the mere addition of accessing a database of densities does not cure or mitigate

the defects of McQueen. Therefore, no combination of McQueen and Gu renders the subject matter of the claims of the present invention obvious.

Examiner has relied on Wargon only to provide a teaching of calculating weights of an item as a function of volume and density. Applicant submits that, in view of the lack of applicability of the McQueen reference as described above, Wargon or Gu/Wargon neither cure not mitigate the defects of McQueen.

Applicant submits that mere selections of words that "match" those recited in the claimed invention, words chosen from a listing of non-essential, optional elements of a reference; or which represent components that are not germane to the invention described in a reference, the reference being otherwise directed to fundamentally different technology, would not render the present invention obvious. Therefore, no combination of McQueen, Gu and Wargon render the apparatus or method of the present invention obvious.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of this rejection.
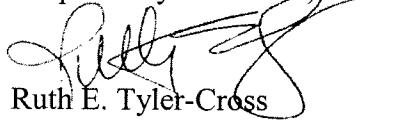
Concluding Remarks

In view of the foregoing, it is requested that the application be reconsidered, that claims 1-11 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at 703-787-9400 (fax: 703-787-7557; email: ruth@wcc-ip.com) to discuss any other changes deemed necessary in a telephonic or personal interview.

If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to International Business Machines Deposit Account No. 50-0510.

Respectfully submitted,

Ruth E. Tyler-Cross
Reg. No. 45,922

Whitham, Curtis, Christofferson & Cook, P.C.
11491 Sunset Hills Road, Suite 340
Reston, VA 20190
703-787-9400 (Telephone)
703-787-7557 (Facsimile)

YOR920030566US1